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Alan I. Cantor
FOLEY & LARDNER
Washington Harbour
3000 K Street, N.W., Suite 500
Washington, DC 20007-5109

EXAMINER

SHAPIRO, LEONID

ART UNIT PAPER NUMBER

2673

DATE MAILED: 08/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/746,405

Applicant(s)

HILL, NICHOLAS P.R.

Examiner

Leonid Shapiro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-97 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-97 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 26 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5-8. 6) ☐ Other: _____.

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1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The disclosure is objected to because of the following informalities: On page 17, Line 13 "or" need to be removed. On page 32, Lines 6-9 shown item numbers 66 and 68 referring to the Fig. 10d. Fig. 10d has no item numbers.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 64-65, 81-83 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure fails to state or teach one skilled in the art about a contact sensitive device wherein at least one sensor comprises display screen and liquid crystals of the display screen which sense bending wave vibration in the member. No drawings, working examples disclosing the necessary parameters has been provided. Without this disclosure, one skilled in the art cannot practice the invention without undue experimentation.

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4. Claims 27-30, 71, 89 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure fails to state or teach one skilled in the art about a contact sensitive device wherein the generated bending wave vibration is not acoustically obvious (outside the audible frequency range and in the ultrasonic frequency range) with background noise or the member with a complex shape. No drawings, working examples disclosing the necessary parameters has been provided. Without this disclosure, one skilled in the art cannot practice the invention without undue experimentation.

5. Claim 76 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure fails to state or teach one skilled in the art about a contact sensitive device wherein information relating to the contact is calculated by comparing the response of bending wave vibration generated by the emitting transducer to a mechanical constraint caused by the contact. No drawings, working examples disclosing the necessary parameters has been provided. Without this disclosure, one skilled in the art cannot practice the invention without undue experimentation.

6. Claim 80 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure fails to state or teach one skilled in the art about a contact sensitive device

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wherein the emitting transducer is one of the group consisting of an inertial transducer and a bender transducer, and the at least one sensor is the other of group. No drawings, working examples disclosing the necessary parameters has been provided. Without this disclosure, one skilled in the art cannot practice the invention without undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 17, 63 rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. Claims 17, 63 stated that: "... **change** in bending wave vibration in the member caused by the contact is the **generation** of bending wave vibration in the member by the contact".

8. Claims 10-11, 42-43, 56-57 rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. Claims 10, 42, 56 stated: "... to derive **additional information** relating to the contact", without specifics what is additional information.

9. Claim 61 rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. Claim 10 stated: "... measuring the changed bending wave vibration at **two** edges of the member", at the same time being dependent from claim 52, which stated: "... from **one** location..." .

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 7-9, 20, 23-26, 32, 39, 40-41, 50, 52, 53-55, 62, 66, 69, 75, 77-79, 84, 87, 93-95, 97 rejected under 35 U.S.C. 102(b) as being anticipated by Knowles et al. (US Patent 5,329,070), cited by the applicant.

As to claim 1, Knowles et al. teaches about a method of determining information related to a contact on a contact sensitive device with steps of:

- providing a member capable of supporting bending wave vibration
(See Fig. 3, item 10, in description See Col. 6, Lines 46-53)
- contacting the member at a discrete location to produce a change in bending wave vibration in the member (See Fig. 8, items t-tx and t-ty, in description See Col.9, Lines 19-30)
- measuring the changed bending wave vibration in the member to determine a measured bending wave signal (See Fig. 8, items t-tx and t-ty, in description See Col.9, Lines 19-30)
- processing the measured bending wave signal to calculate information related to the contact (See Fig. 5, item 72, 88, 101,

in description See Col. 10, Lines 1-19).

As to claim 22, which meets all limitations all claim 1, except:

- generating bending wave vibration in the member to probe
for information relating to the contact

Knowles et al. teaches about generating bending wave vibration in the member to probe for information relating to the contact (See Fig. 3, items 18, 20, 22, 24, in description See Col. 7, Lines 16-21).

As to claim 52, which meets all limitations all claim 1, except:

- generating bending wave vibration in the member from one
location the member to probe for information relating to the
contact

Knowles et al. teaches about generating bending wave vibration in the member from one location the member to probe to probe for information relating to the contact (See Fig. 11, item 18, in description See Col. 17, Lines 15-19).

As to claim 62, which meets all limitations all claim 1.

As to claims 7, 39, 53 Knowles et al. teaches about the information related to location of the contact (See Fig. 6, 7 items 100-142, in description See Col. 10, Lines 37-68 and Col. 11, Lines 1-53).

As to claims 8, 40, 54 Knowles et al. teaches about the information related to pressure of the contact (See Fig. 8, intensity of the signal at times t_{tx} and t_{ty}).

As to claims 9, 41, 55 Knowles et al. teaches about the information related to size of the contact (See Fig. 8, duration of the pulses).

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As to claims 20, 50, 84, Knowles et al. teaches about measuring the changed bending wave vibration at an edge of the member (See Fig. 3, items 18, 20, 22, 24, in description See Col. 7, Lines 16-21).

As to claims 23-24, Knowles et al. teaches about reflection by a contact to produce change in the generated bending wave vibration in the member and vibration is measured using indirect excitation from at least one boundary reflection (See Fig. 3, 8 and 9, items 20,24, in description See Col. 9, Lines 19-30)

As to claims 25-26, Knowles et al. teaches about absorption by a contact to produce change in the generated bending wave vibration in the member and vibration is measured using indirect excitation from at least one boundary reflection (See Fig. 3, 8 and 9, items 20,24, in description See Col. 9, Lines 19-30).

As to claim 66, Knowles et al. teaches about generating bending wave vibration in the member from one location the member to probe to probe for information relating to the contact (See Fig. 11, item 18, in description See Col. 17, Lines 15-19).

As to claims 69, 87, Knowles et al. teaches about the member is in the form of a panel (Fig. 3, item 37).

As to claims 75, 77-79, Knowles et al. teaches about emitting transducer coupled to the member for exciting bending wave vibration in the member to probe for information relating to the contact, wherein emitting transducer has dual functionality and acts as the emitting transducer and the at least one sensor with a relatively equal spacing around the periphery of the member (See Fig. 3, items 18, 20, 22, 24, in description See Col. 7, Lines 16-20)

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11. Claims 93-95, 97 rejected under 35 U.S.C. 102(b) as being anticipated by Hill et al. (WO 97/09842).

As to claim 93, Hill et al. teaches about a control sensitive device incorporating a loudspeaker with:

- a member capable of supporting bending wave vibration and forming an acoustic radiator when excited (See Fig. 1, items 81, 2, 9, in description See page 41, Lines 7-24)
- an exciter coupled to the member for exciting bending wave vibration in the member to probe for information relating to a contact made on a surface of the member, and to cause the member to produce an acoustic output (See Fig. 1, items 81, 2, 9, in description See page 41, Lines 7-24 and Lines 25-30)
- at least one sensor coupled to the member for measuring bending vibration in the member (See Fig. 23, items 63, 65, 66, in description See page 64, Lines 12-18 and page 65, Lines 19-27)
a processor operatively coupled to the at least one sensor for processing information relating to the contact from the change in bending wave vibration in the member produced by the contact and measured by the at least one sensor (See Fig. 23, items 63, 65, 66, in description See page 64, Lines 12-18 and page 65, Lines 19-27)
(See Fig. 27, item 2, 101, in description See page 69, Lines 19-26).

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As to claims 94-95, Hill et al. teaches about the member is in the form of a panel, which has uniform thickness (See Fig. 27, item 2, 101, in description See page 69, Lines 19-26).

As to claim 97, Hill et al. teaches about at least one sensor is mounted on the member spaced from the edge of the member (See Fig. 23, items 63, 65, 66, in description See page 64, Lines 12-18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 2-3, 6 and 21, 34-35, 38, 51, 67, 85 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 1, 22, 34-35, 62, 75 in view of Kambara et al. (US Patent 6,091,406).

As to claims 2-3, 6, 34-35, 38, 51, 85 Knowles does not teach about a correction to convert the measured bending wave signal to a propagation signal from a non-dispersive wave source, connected to a material of a member and using self-measuring scheme which is incorporated into the contact sensitive device.

Kambara shows how to do the correction and uses self-measuring scheme (See Fig. 1, items 11-12, 18-19, in description See Col. 14, Lines 5-15 and Col. 11, Lines 30-55). It would

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been obvious to the one ordinary skill in the art in the time of invention to use Kambara et al. approach in the Knowles apparatus in order to improve the quality of the touch detection.

As to claims 21, 67, Knowles does not teach about measuring the chaged bending wave vibration at a position spaced from the edges of the member.

Kambara shows the piezoelectric transducers mounted on inclined surface (See Fig. 5 and 6, items 4a, 4b and 10a, 10b, in description See Col.18, Lines 5-12). It would been obvious to the one ordinary skill in the art in the time of invention to use Kambara et al. approach in the Knowles apparatus in order to improve the quality of the touch detection.

13. Claims 4, 36 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles and Kambara et al. as aforementioned in claims 3, 35 in view of Weigers et al. (US Patent No. 5,856,820), sited by the applicant.

Knowles and Kambara et al. do not teach about the modeling by using the bending wave equation in combination with known physical parameters of the material of the member.

Weigers et al. show the usage of the wave equation in relation to the backing layer (See in description Col. 2, Lines 63-66). It would been obvious to the one ordinary skill in the art in the time of invention to use Weigers et al. approach in the Knowles and Kambara et al. method in order to improve the quality of the touch detection.

14. Claims 5, 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles and Kambara et al. as aforementioned in claim 3, 35 in view of Zook et al. (US Patent No. 6,246,638 B1).

Knowles and Kambara et al. do not teach about the dispersion relation is measured by using a laser vibrometer to create an image of the vibration pattern in the member for a number of given frequencies to give the dispersion relation in the frequency range of interest.

Zook et al. show the usage of the laser vibrometer to measure the amplitude of vibration for the given frequency (See in description Col 5, Lines 57-60). It would be obvious to the one ordinary skill in the art in the time of invention to use Zook et al. approach in the Knowles and Kambara et al. method in order to improve the quality of the touch detection.

15. Claims 12-14, 44-46, 58-59 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 1, 22, 52 in view of Takahashi et al. (US Patent No. 5,638,093).

Knowles does not teach about determination by the frequency content of measured bending wave of the contact type (finger or stylus).

Takahashi et al. shows how to determine accurately and stably the contact type by the width of the area touched (See Fig. 3, 7, item 201-210, in description See Col. 4, Lines 31-36 and Col. 7, 62-66). As notoriously well known in the art there is direct relationship between the width of the pulse (See Fig. 7) in the time domain and the frequency content in the frequency domain. It would be obvious to the one ordinary skill in the art in the time of invention to use Takahashi et al. approach in the Knowles et al. apparatus in order to improve the quality of the touch detection.

16. Claims 15, 47 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 1, 22 in view of Tager et al. (US Patent No. 6,160,757).

Knowles does not teach about the usage an adaptive algorithm to derive information relating to the contact from measuring bending wave signal.

Tager et al shows how to use adaptive algorithms to estimate field for acoustic-pickups (See in description Col.5, Lines 50-67). It would been obvious to the one ordinary skill in the art in the time of invention to use Tager et al. approach in the Knowles apparatus in order to improve the quality of the touch detection with member of complex shape.

17. Claims 16, 48 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles and Tager et al. as aforementioned in claims 15, 47 in view of Hoffberg et al. (US Patent No. 6,400,996 B1).

Knowles and Tager et al. do not teach about the implementation of adaptive algorithm in a neural net.

Hoffberg et al. teaches about neural networks as important tools for extracting patterns from complex input sets (See in description Col. 21, Lines 18-30). It would been obvious to the one ordinary skill in the art in the time of invention to use Hoffberg et al. approach in the Knowles and Tager et al. apparatus in order to improve the quality of the touch detection with member of complex shape with the usage of an adaptive algorithm.

18. Claim 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claim 1 in view of Flowers (US Patent No. 6,160,757).

Knowles does not teach about the bending wave vibration in the member is caused by the background noise.

Flowers describes the background noise in location system (See in description Col.3, Lines 23-25). It would have been obvious to the one ordinary skill in the art in the time of invention to

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use Flowers. approach in the Knowles apparatus in order to improve the quality of the touch detection by reducing the background noise.

19. Claims 19, 33, 49, 60 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 1, 22, 52 in view of Kent (US Patent No. 5,986,224).

As to claims 19, Knowles does not teach about comparing the measured bending wave signal with a reference signal to identify when contact made.

Kent teaches about reference signal compensating for many physical characteristics, drift, temperature... (See in description Col.40, Lines 29-33). It would been obvious to the one ordinary skill in the art in the time of invention to use Kent approach in the Knowles apparatus in order to improve the quality of the touch detection by the use of the reference signal.

As to claim 33, Knowles does not teach about the processing step of isolating undesired signals from the changed bending wave vibration produced by the contact by comparing the measured bending wave signal with a reference signal to identify when contact made.

Kent teaches about reference signal compensating for many physical characteristics, drift, temperature... (See in description Col.40, Lines 29-33). It would been obvious to the one ordinary skill in the art in the time of invention to use Kent approach in the Knowles apparatus in order to improve the quality of the touch detection by the use of the reference signal.

20. Claim 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claim 22 in view of Azima (WO 97/09847), sited by the applicant.

Knowles does not teach about an acoustic radiator of a loudspeaker.

Azima shows an acoustic radiator of a loudspeaker as panel-form loudspeaker (See 1, items 1, 2, 9, in description See page 4, Lines 21-19).). It would have been obvious to the one

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ordinary skill in the art in the time of invention to use Azima approach in the Knowles apparatus in order to improve the quality of the touch detection.

21. Claim 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles and Azima as aforementioned in claim 31 in view of Kent.

Knowles and Azima do not teach about the processing step of isolating undesired signals from the changed bending wave vibration produced by the contact by comparing the measured bending wave signal with a reference signal to identify when contact made.

Kent teaches about reference signal compensating for many physical characteristics, drift, temperature... (See in description Col.40, Lines 29-33). It would been obvious to the one ordinary skill in the art in the time of invention to use Kent approach in the Knowles and Azima apparatus in order to improve the quality of the touch detection by the use of the reference signal. It need to be noted that Azima uses multiple sensors.

22. Claims 68, 70, 86, 88, rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claim 62, 75 in view of Hotta et al. (US Patent No. 4,389,711).

Knowles does not teach about the member is transparent with uniform thickness.

Hotta et al. show the usage of the transparent member (See Fig. 2, item 3, in description Col 5, Lines 1-2). It would been obvious to the one ordinary skill in the art in the time of invention to use Hotta et al. approach in the Knowles apparatus in order to improve the quality of the touch detection.

23. Claims 73-74, 91-92 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 62, 75 in view of Koh et al. (US Patent No 6,335,725 B1).

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Knowles does not teach about a lap-top computer or a personal data assistant with contact sensitive device.

Koh et al. shows the usage of the contact sensitive device in a lap-top computer or a personal data assistant (See Fig. 1, items 2, 4, 8, in description Col 3, Lines 23-29). It would be obvious to the one ordinary skill in the art in the time of invention to use Knowles device in the Koh et al. apparatus in order to widen the area of applications for touch sensitive devices.

24. Claims 72, 90 rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles as aforementioned in claims 62, 75 in view of Ketwich (US Patent No 6,072,475).

Knowles does not teach about mobile phone with contact sensitive device.

Ketwich shows the usage of the contact sensitive device in a mobile phone (See Fig. 12b, item 1975, item 1911, in description Col 11, Lines 48-53). It would be obvious to the one ordinary skill in the art in the time of invention to use Knowles device in the Ketwich apparatus in order to widen the area of applications for touch sensitive devices.

25. Claim 96 rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. as aforementioned in claim 93 in view of Romein (US Patent No. 4,246,439).

Hill et al. does not teach about at least one sensor is mounted at the edge of the member.

Romein shows sensors are mounted at the edge of the member (See Fig. 1, items 6-7, in description Col 2, Lines 18-29). It would be obvious to the one ordinary skill in the art in the time of invention to use Romein located sensors in the Hill et al. apparatus in order to widen the area of applications for touch sensitive devices.

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

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- The Amstrong (US Patent No. 6,366,277 B1) reference discloses contaminant processing system for an acoustic touch screen.
- The Rego (US Patent No. 6,157,373) reference discloses method and apparatus for displaying images.
- The Vanderheiden (US Patent No. 6,384,743 B1) reference discloses touch screen for the vision-impaired.
- The Baller et al. (US Patent No. 5,541,372) reference discloses force activated touch screen measuring deformation of the front panel.
- The Vanderheiden (US Patent No. 6,049,328) reference discloses flexible access system for touch screen devices.
- The Marcus (US Patent No. 5,161,126) discloses acoustic flute Web edge sensor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 703-305-5661. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703-305-4938. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

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August 8, 2002



BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600